UNIVERSITY OF ILLINOIS

Agricultural Experiment Station

URBANA, ILLINOIS, OCTOBER, 1909

CIRCULAR No. 134

COW INDEX OF KEEP AND PROFIT

A Table that Tells All Items of Expense, Income and Profit or Loss per Year of Any Cow if Her Production is Known

BY WILBER J. FRASER, CHIEF IN DAIRY HUSBANDRY

The economic items of a dairy herd figured out and put into a system. How any dairyman can apply the table to his own herd without further figuring.

NEW TABLE THAT ANSWERS THE GREAT ECONOMIC QUESTIONS ABOUT THE INDIVIDUAL COWS IN ANY HERD, AND HOW TO USE IT

How much is this cow worth? And that one?

How much milk and how much butter fat does she produce per year?

What profit will she return each year?

What is the cost of her feed for one year? Of the labor? What are the other expenses and depreciation?

What is the value per year of the skim milk? Of the manure?

Will the skim milk, calf and manure pay all expenses except feed?

These are vital questions (financially) for every dairyman, concerning every individual cow in his herd. If he will answer the second question, the table on pages 4-7 will answer the other nine. It is a ready reckoner of cow economics.

The efficient cow is the chief factor in making money on a dairy farm. Good dairying is one of the most remunerative lines of farming, and for this reason even poor, unbusiness-like dairying may result in some gain. As a rule the average, or even the best dairymen, neither know nor suspect the extent to which the profit or loss from each individual cow affects the profit received from the whole herd. The profit on the good cows covers up the loss on the poor ones, and thus the owner fails to see how easily and to what extent the profits could be increased by simply disposing of a few poor cows. If the largest returns are to be obtained, it is necessary to weed out the unprofitable cows from the herd. This testing and weeding out of the unprofitable cows has been advocated for several years. Test associations for this purpose have been recently started in all the most prominent dairy countries of the world. Hoard's Dairyman, thru its valuable cow census work,

has shown clearly that many herds in different sections of the United States are kept at an actual loss. The Department of Dairy Husbandry at the University of Illinois has published no less than ten bulletins and circulars on this subject in the past five years. But for all that, both the dairymen and the public have not realized the full significance of this work. The reason so many herds are kept at an actual loss or little profit is because a man with a large herd of poor cows may receive a large check at the end of each month, but he does not see the large expense bill that must be subtracted from this. The total receipts must not be looked upon as the net profit.

In an attempt to bring out these facts more clearly, and to save the dairymen much figuring, the following table has been worked out. This table is based on the experience and findings of the Department of Dairy Husbandry during the past thirteen years. To illustrate the use and value of this table, it is here applied to the yearly records of the individual cows of 5 herds taken from the many herds which have been tested by this department.

This table and its application to herds proves that many men are, twice each day, milking cows that are not paying for the feed they eat. Yet the laborious task is continued, year after year, in the vain attempt to make money with a class of cows utterly unable to return a profit. The game of making money with inefficient cows is absolutely blocked, yet many dairymen are so busy milking these poor cows that their vision is apparently bedimmed, and they cannot see the ultimate outcome. One might as well pay his entry fee and attempt to win a race in the 2:10 class with a draft horse that could not go a mile in five minutes, as to attempt to make money with some of the cows that are being milked. Just think of the "Wasting of years of weary, unprofitable toil" on our dairy farms in doing all the labor of preparing the ground, planting, cultivating, harvesting and storing the crops, only to dispose of the feed to a dairy herd in which many of the individual cows are kept at an actual loss. All of this waste of labor and energy might easily be obviated if intelligence and common sense were used in establishing and breeding up an efficient dairy herd. To present and impress the facts of profit and loss in the herds as they are today, is the object of this table and its application.

TABLE 1.—BASED ON AVERAGES FROM CLASSES OF COWS OF DIFFERENT PRODUCTION, CONSIDERING THEIR VALUE, PRODUCTION, THE COST OF KEEP AND INCOME FROM PRODUCTS.

1. Value of cow at first freshening	$30.00				$35.00				$40.00				$45.00	
2. Value of cow for beef at end of life	30.00				29.00				27.00				25.00	
3. Difference, or depreciation during life	0.00				6.00				13.00				20.00	
4. Pounds milk produced	2000	2250	2500	2750	3000	3250	3500	3750	4000	4250	4500	4750	5000	5250
5. Pounds skim milk, 85 per cent of whole milk	1700				2550				3400				4250	
6. Value of skim milk at 20c	$3.40				$5.10				$6.80				$8.50	
7. Value of each calf: Bull / Heifer / Average	$3 / 3 / 3.00				$3 / 3 / 3.00				$3 / 4 / 3.50				$3 / 5 / 4.00	
8. Value of manure at an average price of $1.50 per ton	13.50				14.00				14.50				15.00	
9. Total value of skim milk, calf and manure	**$19.90**				**$22.10**				**$24.80**				**$27.50**	
10. Cost of labor	$17.00				$17.50				$18.00				$18.50	
11. Interest, taxes, insurance and repairs on barn	4.00				4.00				4.00				4.00	
12. Service fee	2.00				2.00				2.00				2.00	
13. Interest, depreciation on cow	1.50				2.62				3.89				5.15	
14. Veterinary service, medicine, and spraying materials	.20				.30				.40				.50	
15. Depreciation on dairy utensils	.60				.65				.70				.75	
16. Total expense of labor, housing, service fee, interest and depreciation on cow and utensils	**$25.30**				**$27.07**				**$28.99**				**$30.90**	
17. Does skim milk, calf and manure pay labor, interest and depreciation on cow?	**-$5.40**	**-$5.29**	**-$5.18**	**-$5.07**	**-$4.97**	**-$4.77**	**-$4.58**	**-$4.38**	**-$4.19**	**-$3.99**	**-$3.79**	**-$3.60**	**-$3.40**	**-$3.13**
18. Pounds butter fat in 4 per cent milk	80	90	100	110	120	130	140	150	160	170	180	190	200	210
19. Value of butter fat at 27 cents per pound	$21.60				$32.40				$43.20				$54.00	
20. Cost of feed for cow	34.00				36.00				38.00				40.00	
21. Profit from butter fat over feed	**-$12.40**	**-$10.20**	**-$8.00**	**-$5.80**	**-$3.60**	**-$1.40**	**+$ .80**	**$3.00**	**$5.20**	**$7.40**	**$9.60**	**$11.80**	**$14.00**	**$16.20**
22. Total years profit per cow	*-$17.80*	*-$15.49*	*-$13.18*	*-$10.78*	*-$8.57*	*-$6.17*	*-$3.78*	*-$1.38*	*+$1.01*	*$3.41*	*$5.81*	*$8.20*	*$10.60*	*$13.07*

TABLE 1. CONTINUED.—BASED ON AVERAGES FROM CLASSES OF COWS OF DIFFERENT PRODUCTION, CONSIDERING THEIR VALUE, PRODUCTION, THE COST OF KEEP, AND INCOME FROM PRODUCTS.

1. Value of cow at first freshening			$50.00				$60.00				$70.00			
2. Value of cow for beef at end of life			25.00				25.00				25.00			
3. Difference, or depreciation during life			25.00				35.00				45.00			
4. Pounds milk produced	5500	5750	6000	6250	6500	6750	7000	7250	7500	7750	8000	8250	8500	8750
5. Pounds skim milk, 85 per cent of whole milk			5100				5950				6800			
6. Value of skim milk @ 20c			$10.20				$11.90				$13.60			
7. Value of each calf { Bull / Heifer } Average			$3 / 6 } 4.50				$3 / 8 } 5.50				$3 / 10 } 6.50			
8. Value of manure at an average price of $1.50 per ton			15.50				16.00				16.50			
9. Total value of skim milk, calf and manure			**$30.20**				**$33.40**				**$36.60**			
10. Cost of labor			$19.00				$19.50				$20.00			
11. Interest, taxes, insurance and repairs on barn			4.00				4.00				4.00			
12. Service fee			2.00				2.00				2.00			
13. Interest, depreciation on cow			6.14				8.10				10.06			
14. Veterinary service, medicine, and spraying materials			.60				.70				.80			
15. Depreciation on dairy utensils			.80				.85				.90			
16. Total expense of labor, housing, service fee, interest and depreciation on cow and utensils			**$32.54**				**$35.15**				**$37.76**			
17. Does skim milk, calf and manure pay labor, interest and depreciation on cow?	**-$2.87**	**-$2.60**	**-$2.34**	**-$2.19**	**-$2.04**	**-$1.90**	**-$1.75**	**-$1.60**	**-$1.45**	**-$1.31**	**-$1.16**	**-$1.00**	**-$0.84**	**-$0.68**
18. Pounds butter fat in 4 per cent milk	220	230	240	250	260	270	280	290	300	310	320	330	340	350
19. Value of butter fat at 27c per pound			$64.80				$75.60				$86.40			
20. Cost of feed for cow			42.00				44.00				46.00			
21. Profit from butter fat over feed	**$18.40**	**$20.60**	**$22.80**	**$25.00**	**$27.20**	**$29.40**	**$31.60**	**$33.80**	**$ 36.00**	**$38.20**	**$40.40**	**$42.60**	**$44.80**	**$47.00**
22. Total year's profit per cow	*$15.53*	*$18.00*	*$20.46*	*$22.81*	*$25.16*	*$27.50*	*$29.85*	*$32.20*	*$34.55*	*$36.89*	*$39.24*	*$41.60*	*$43.96*	*$46.32*

TABLE 1.—CONTINUED.—BASED ON AVERAGES FROM CLASSES OF COWS OF DIFFERENT PRODUCTION, CONSIDERING THEIR VALUE, PRODUCTION, THE COST OF KEEP, AND INCOME FROM PRODUCTS.

1. Value of cow at first freshening	$80 00				$90.00				$100.00				$110.00
2. Value of cow for beef at end of life	25.00				25.00				25.00				25.00
3. Difference, or depreciation during life	55.00				65.00				75.00				85.00
4. Pounds milk produced	9000	9250	9500	9750	10000	10250	10500	10750	11000	11250	11500	11750	12000 10200
5. Pounds skim milk, 85 per cent of whole milk	7650				8500				9350				10200
6. Value of skim milk at 20c	$15.30				$17.00				$18.70				$20.40
7. Value of { Bull / each calf { Heifer } Average	$ 3 / 13 { 8.00				$16 / 16 { 16.00				$20 / 20 { 20.00				$24 / 24 { 24.00
8. Value of manure at an average price of $1.50 per ton	17.00				17.50				18.00				18.50
9. Total Value of skim milk, calf and manure	**$40.30**				**$50.50**				**$56.70**				**$62.90**
10. Cost of labor	$21.00				$22.00				$23.00				$24.00
11. Interest, taxes, insurance and repairs on barn	4.00				4.00				4.00				4.00
12. Service fee	2.00				2.00				2.00				2.00
13. Interest, depreciation on cow	11.98				13.97				15.93				17.89
14. Veterinary service, medicine, and spraying materials	.90				1.00				1.10				1.20
15. Depreciation on dairy utensils	.95				1.00				1.05				1.10
16. Total expense of labor, housing serving fee, interest and depreciation on cow and utensils	**$40.83**				**$43.97**				**$47.08**				**$50.19**
17. Does skim milk, calf and manure pay labor, interest and depreciation on cow	**-.53**	**-.39**	**-.25**	**-.10**	**+$6.53**	**$7.30**	**$8.07**	**$8.85**	**$9.62**	**$10.39**	**$11.16**	**$11.94**	**$12.71**
18. Pounds butter fat in 4 per cent milk	360	370	380	390	400	410	420	430	440	450	460	470	480
19. Value of butter fat at 27c per pound	$97.20				$108.00				$118.80				$129.60
20. Cost of feed for cow	48.00				50.00				52.00				54.00
21. Profit from butter fat over feed	**$49.20**	**$51.40**	**$53.60**	**$55.80**	**$58.00**	**$60.20**	**$62.40**	**$64.60**	**$66.80**	**$69.00**	**$71.20**	**$73.40**	**$75.60**
22. Total year's profit per cow	*$48.67*	*$51.01*	*$53.35*	*$55.70*	*$64.53*	*$67.50*	*$70.47*	*$73.45*	*$76.42*	*$79.39*	*$82.36*	*$85.34*	*$88.31*

TABLE 1.—CONTINUED.—BASED ON AVERAGES FROM CLASSES OF COWS OF DIFFERENT PRODUCTION, CONSIDERING THEIR VALUE, PRODUCTION, THE COST OF KEEP, AND INCOME FROM PRODUCTS.

1. Value of Cow at first freshening				$120.00				$130.00				$140.00
2. Value of cow for beef at end of life				25.00				25.00				25.00
3. Difference, or depreciation during life				95.00				105.00				115.00
4. Pounds milk produced	12250	12500	12750	13000	13250	13500	13750	14000	14250	14500	14750	15000
5. Pounds skim milk, 85 per cent of whole milk				11050				11900				12750
6. Value of skim milk at 20c				$22.10				$23.80				$25.50
7. Value of each calf: Bull				$29				$34				$40
Heifer				29				34				40
Average				$29.00				34.00				40.00
8. Value of manure at an average price of $1.50 per ton				19.00				19.50				20.00
9. Total value of skim milk, calf and manure				**$70.10**				**$77.30**				**$85.50**
10. Cost of labor				$25.00				$26.00				$27.00
11. Interest, taxes, insurance and repairs on barn				4.00				4.00				4.00
12. Service fee				2.00				2.00				2.00
13. Interest and depreciation on cow				19.85				21.61				23.77
14. Veterinary service, medicine, and spraying materials				1.30				1.40				1.50
15. Depreciation on dairy utensils				1.15				1.20				1.25
16. Total expense of labor, housing, service fee, interest and depreciation on cow and utensils				**$53.30**				**$56.21**				**$59.52**
17. Does skim milk, calf and manure pay labor, interest and depreciation on cow	**$13.73**	**$14.75**	**$15.77**	**$16.80**	**$17.87**	**$18.94**	**$20.01**	**$21.09**	**$22.31**	**$23.53**	**$24.75**	**$25.98**
18. Pounds butter fat in 4 per cent milk	490	500	510	520	530	540	550	560	570	580	590	600
19. Value of butter fat at 27c per pound				$140.40				$151.20				$162.00
20. Cost of feed for cow				56.00				58.00				60.00
21. Profit from butter fat over feed	**$77.80**	**$80.00**	**$82.20**	**$84.40**	**$86.60**	**$88.80**	**$91.00**	**$93.20**	**$95.40**	**$97.60**	**$99.80**	**$102.00**
22. Total year's profit per cow	*$91.53*	*$94.75*	*$97.97*	*$101.20*	*$104.47*	*$107.74*	*$111.01*	*$114.29*	*$117.71*	*$121.13*	*$124.55*	*$127.98*

HOW TO USE THE TABLE

This table shows how the profit differs with cows differing in production from 2000 to 15,000 pounds of milk per year. There is a column of figures for each increase of 250 pounds of milk. To find the profit or loss of any individual cow, it is only necessary to follow line 4 to the column having the number of pounds of milk nearest to the production of the cow; run down the column to line 17, the first figures in large black type, and note these. Begin again on line 18, following it to the figures that correspond the nearest to the pounds of butter fat produced by the cow; go down this column to line 21, the second figures in large black type. The sum of these two amounts in large black type gives the total year's profit or loss from the cow. The reason that the cost of feed should be based on the figures found in the column with the butter fat, and not in the column with the milk, is because cows producing rich milk require more feed per hundred pounds of milk than cows testing low in butter fat.

As an example of how to use Table 1, the returns from the first cow in herd No. 1 are here figured. She produced 4191 pounds of milk and 122 pounds of butter fat. In line 4 find the number of pounds of milk nearest that produced by the cow, which in this case is 4250. Follow down this column to line 17, the first figures in large black type, which are $3.99. Beginning again on line 18, follow it to the figures that correspond the nearest to the pounds of butter fat produced by the cow, which in this case are 120. Go down the column to line 21 and find the next figures in large black type, $3.60. The sum of these two amounts—3.99 and 3.60, is $7.59, the total year's loss from this cow.

As a second example, the last cow in herd No. 1 gave 6665 pounds of milk and 276 pounds of butter fat. Her milk production places her in the column headed 6750 pounds of milk, resulting in a loss of $1.90, as shown in the large black type, line 17. Her production of butter fat—276 pounds—places her in the 280-pound class, showing a profit of butter fat over feed of $31.60, line 21. The sum of this $31.60 and the —$1.90 previously found in line 17, is $29.70—the total year's profit for this cow.

DETAILED EXPLANATION OF TABLE

These figures in Table 1 are based upon conditions as they exist today, which in many cases are far below the ideal.

The price for the product is considered at the market value of butter fat at the creamery, and this price should be obtained by any dairyman in the state, no matter what his location. If the milk were shipped to a city for direct consumption, retailed directly to the consumer, or cream sold for a fancy trade, the returns would be much greater than indicated in the table.

The production per cow is the average for six years,—the length of time cows are milked in most herds. Altho some cows produce for twice this length of time, there are also many which drop out after only one or two years' production.

1.* The value of the cows producing the different yields is estimated as nearly as possible at their actual market price. Cows producing 2000 pounds of milk are valued at $30, and their value increases $5 for every additional thousand pounds produced up to 6000 pounds; above this, $10 for every thousand pounds' increase in production.

2. The value of cows when disposed of is estimated at $30 for cows producing 2000 pounds of milk, and this price decreases to $25 for cows giving 5000 pounds of milk and above.

5. The amount of skim milk is figured as 85 percent of the whole milk, as this is the amount returned from creameries or obtained from the hand separator on the farm.

6. Skim milk is valued at 20 cents per hundred pounds, since the best data show that it requires an average of 5 pounds of skim milk to equal one pound of grain in pork production. When grain is worth one cent a pound, or $1 per hundred pounds, skim milk would be worth 20 cents per hundred pounds. If the skim milk is fed to heifer calves of good quality, the value will vary from 20 cents to $1.00 per hundred pounds, depending upon the conditions and the quality of the calves.

7. Calves from cows producing less than 5000 pounds of milk annually are considered at veal prices only, and are valued at $3 when five days old, when the milk of the dam is fit for use. From

*Paragraph numbers correspond with line numbers of the table.

cows producing more than 5000 pounds of milk annually, the value of the heifer calves increases more rapidly, as the dams are more efficient producers. Bull calves are not considered of value except for veal, unless they are from cows producing an average of 10,000 pounds of milk annually, in which case their value is placed at $16, and this value increases at the same rate as the heifers from higher producing dams. The question may rightly be raised if bulls from grade cows should be used for service. It would be better not to do so, unless it is known that the dams were, for at least two generations, good producers, but at the present stage of dairy cattle breeding in the United States, bull calves from cows producing an average of 10,000 pounds of milk for six years would be of service in increasing the production of our future dairy cows. In fact, it is by this method that the dairy cattle of Denmark have been so markedly improved in the last 25 years.

8. The manure is figured at 11 tons per head for cows producing 8000 pounds of milk. On the twenty-acre dairy farm at the University last year, cows which were kept in the barn during the winter, and in a dry lot during the summer, produced 13 tons of manure per cow. The average value is considered at $1.50 per ton. At the Illinois Agricultural Experiment Station, on a three-year rotation of corn, oats and clover, manure has increased the crop yield $1.60 for each ton of manure used, figuring the market value of the crops, for the first three years after it is applied. No consideration is taken of the increased production from the effects of the manure after the first three years. At the Ohio Experiment Station, the value of the crop yields has been increased $2.34 for each ton of manure used. From the figures above stated, $1.50 a ton is a conservative value on cow manure which has been well cared for. Cows which produce less than 8000 pounds of milk will produce, on the average, less than 11 tons of manure. Cows producing more than 8000 pounds of milk will not only produce more manure, but it will be of a better quality, owing to the fact that they are fed more concentrates. For these reasons, the value of the manure is lowered 50 cents per cow for every 1000 pounds' decrease in production of milk below 8000 pounds, and raised 50 cents per 1000 pounds' increase in production above 8000 pounds.

10. The labor per cow at the dairy of the University of Illinois has amounted to $22, where the cows were stabled continuously thruout the year. This is more, decidedly, than it will cost under the ordinary farmer's conditions, hence $20 is taken as a basis for labor on cows producing 8000 pounds of milk annually. The labor for cows producing less than 8000 pounds of milk will not depreciate materially, as feeding, watering, cleaning stables and caring for the individual cows will be practically the same, regardless of their production, and cows giving less milk will be much slower milkers, thus requiring more time per pound of milk obtained. The labor is reduced only 50 cents for every thousand pounds' decrease in milk production below 8000 pounds, making a minimum cost of labor on a cow producing 2000 pounds of milk, $17. With increased production, only a small amount of extra labor is required in caring for the cows, and as large producers give down their milk more freely, less time is consumed per pound of milk in milking, and one dollar is added to the cost of labor for each 1000 pounds' increase in yield.

11. The average barn for a herd of 40 cows is worth $2000, or $50 per cow. The interest on this, per cow, would amount to $2.50 a year, and taxes, insurance, repairs, and depreciation will amount to $1.50 a year, making a total cost per cow for buildings and their maintenance, of $4 per year.

12. The total annual expense of keeping a good pure-bred sire, including feed, care and depreciation, is $75. In a herd of 40 cows, $2 per cow must be allowed, annually, to have each calf sired by a pure-bred.* Since this amount is so small, every dairyman should keep a good pure-bred sire, even tho he has but a small number of good cows in his herd.

13. On the average, cows will be kept in dairy herds for six years, therefore the annual depreciation on the cow is figured as one-sixth of the difference between the value at the time of first freshening and the value when disposed of. To this must be added the interest on the value of the cow each year.

14. Spraying materials, medicine, and veterinary service are estimated at 10 cents per 1000 pounds of milk produced. While the relative increase is rapid, it is true that the large producers are

*For details of computation, see Illinois Experiment Station circular No. 118.

the ones requiring more medical attention, and cows producing only 2000 or 3000 pounds of milk in a year need little, if any, of this expenditure.

15. The expense for dairy utensils, if the milk is taken to a condensing factory, bottling plant, or creamery, should be about 90 cents for a cow producing 8000 pounds of milk. If the milk is separated on the farm, fewer cans are required and less expense is involved in hauling the milk, but, to offset this, there is an additional outlay for a cream separator. If milk is shipped to a large city, it is necessary to have five sets of cans, which, being badly handled and frequently lost, makes the expense for cans heavy. However, as the milk is sold by measure, it has been found by actual practice that the denting of the cans soon makes them hold enough less milk to compensate for the wear, tear, and loss on cans. Since the cost of utensils will depend somewhat upon the amount of milk handled, an allowance of 5 cents per 1000 pounds of milk produced is made.

17. To determine when the value of skim milk, calf and manure will pay for the labor, housing, service fee, interest, and depreciation on cow and dairy utensils, compare the upper and lower figures in light bold-faced type. The difference between these is shown by the upper line of figures in large black type. From these, it can be seen that in the case of the cows producing less than 9000 pounds of milk, the skim milk, calf and manure do not pay for the labor, housing, service fee and depreciation on cows and utensils, while with cows producing more than this amount, these returns are so much greater that there is a rapid rise in profit as the production increases.

18. To obtain the final results of profit or loss per cow, the milk, to be as near the average for all breeds as possible, is considered to contain 4 percent butter fat, which is the average of the 1200 cows tested by this station. In applying the table to a herd, computations for each individual cow must be made, depending upon the total amount of butter fat in her milk.

19. The value of the butter fat is based upon the Elgin prices for butter during the years 1907 and 1908, which averaged slightly above 27 cents. The overrun, which is the amount of butter made

above the amount of butter fat, is allowed for the expense of making the butter.

20. The cost of feed per cow is based on the prices of feed for the past two years, which is decidedly higher than formerly. The cost of feed is raised $2 for each 1000 pounds' increase in production of milk. This increase is based upon a large number of yearly records kept at the University of Illinois, where an accurate account is kept of all feed consumed and milk and butter fat produced for the entire year, on cows that vary in production from 2000 to 15,000 pounds of milk annually. Too much emphasis cannot be placed upon the fact that the milk is made more economically by the higher producers, as thev are far more efficient cows.

21. The profit from the butter fat over the cost of feed is shown by the figures in line 21. The total year's profit for the cow is obtained by adding the profit from butter fat over feed (line 21) and the profit of skim milk, calf and manure over the cost of labor, housing, depreciation, etc., (line 17). This gives the final account of where the cow stands with the dairyman, and is shown by the figures in *italics,* line 22. This last line of figures shows clearly the great folly and waste of time and labor in keeping poor producers, and, in striking contrast to this, the profit derived from keeping good producers.

Table 1 may safely be used as an index to the profits, because under existing conditions nearly all herds contain individual cows of vastly different production. On the majority of dairy farms in the intensive dairy region of Illinois, all cows in milk are fed practically alike as to grain, regardless of their production, and their being in the same herd, the cost of all items for the different cows will be nearly the same. Under these conditions the actual difference in profit between the good and poor cows will be even greater than the table indicates.

These figures are based upon definite data worked out at the Experiment Station, but the results will fluctuate slightly, according to the way the herds are fed. The price of feed varies in different years, but as a rule the price of the product varies with the feed, so that this fluctuation is small. When a dairyman uses this table, the question is not whether the results obtained are absolutely correct to a few cents, as it makes no special difference to

a farmer whether a cow brought in a profit of $10 or $10.50, but it does make an enormous difference whether she lost him $5, or made him $20, as may be easily done by ordinary cows producing within the range of many cows in the average herd.

Economic conditions are not the same in different parts of the country, and while this table is made to apply especially to the Central West, it should be found applicable to the entire country. In the eastern part of the United States, feed is higher, and it will cost more to keep a cow a year than in the Central West, but the value of the product is also greater, while in the West the cost of keep will be less than in Illinois, but the receipts for the product will also be less. For these reasons the application of the table should be a good guide in any part of the country, and its object accomplished, as it is designed to show, in the most striking manner possible, the difference between good and poor herds for the purpose of making money.

To illustrate the use of Table 1 and to show what is the trouble with many of our dairymen, and how the difficulty may be remedied, the profit, based upon the actual production of five herds which have been tested for an entire year by this department, has been figured out according to Table 1.

The following tables are not merely a lot of cow records, but the results in black faced type are interpretations of cow records in terms of profit and loss. The results speak largely for themselves, but a brief discussion follows each herd.

TABLE 2.—HERD NO. 1.

No. Cow	Age	Lb. Milk	Lb. Fat	Percent Fat	Profit	Loss
1	3	4191	122	2.91		$7.59
2	2	3441	126	3.66		5.98
3	3	3869	136	3.51		3.58
4	3	4255	158	3.71	$ 1.21	
5	3	4594	165	3.60	3.61	
6	3	4613	176	3.81	5.81	
7	3	4857	176	3.62	6.00	
8	3	4551	177	3.88	5.81	
9	6	5019	185	3.68	6.20	
10	3	5617	185	3.29	6.73	
11	8	4833	186	3.84	8.20	
12	3	5537	194	3.48	8.93	
13	3	5892	202	3.42	11.66	
14	3	4494	209	4.65	12.41	
15	3	5621	211	3.75	13.33	
16	8	6510	211	3.24	14.16	
17	3	6661	211	3.16	14.30	
18	3	5631	215	3.82	15.80	
19	5	7438	238	3.20	21.35	
20	10	6639	244	3.69	20.90	
21	10	6523	259	3.98	25.16	
22	10	9092	260	2.86	26.67	
23	11	7036	265	3.76	27.65	
24	4	6665	276	4.29	29.70	
					$285.59	$17.15
					17.15	
					$268.44	
Av.		5565	199	3.57	$11.18	

Difference in profit between best and poorest cows, $37.29

While there are only three unprofitable cows in the above herd, such a large number of those on the profitable side of the account net so small a return that the average for the entire herd—$11.18—is far below the returns that should be expected from a good dairy herd. Just six cows of this herd return the profit that should be expected of a good dairy cow. No cow producing less than $16 profit a year should be retained. Had this herd consisted of 10 cows like the best one, the owner would have made more profit than with the present herd of 24 cows, and had the whole herd been as good as the best individual, the profit would have been practically $710, or nearly three times as much as that actually received. Such a change would be a stroke of business worth while.

TABLE 3.—HERD NO. 2.

No. Cow	Age	Lb. Milk	Lb. Fat	Percent Fat	Profit	Loss
1	3	2496	102	4.09		$13.18
2	5	3158	107	3.39		10.57
3	13	3369	110	3.27		10.57
4	7	4178	121	2.90		7.59
5	3	3389	123	3.63		8.18
6	15	3349	124	3.70		8.37
7	3	3036	124	4.08		8.57
8	6	3415	125	3.66		5.98
9	6	3947	128	3.24		5.59
10	8	3438	132	3.84		5.98
11	3	3263	133	4.08		6.17
12	8	3435	134	3.90		5.98
13	3	3547	145	4.09		1.58
14	8	3686	149	4.04		1.38
15	3	2429	151	6.22		2.18
16	8	3922	157	4.00	$1.01	
17	4	3612	158	4.37	.62	
18	8	4185	158	3.78	1.21	
19	8	4296	161	3.75	1.21	
20	4	4328	168	3.88	3.41	
21	6	4131	170	4.12	3.41	
22	11	4290	175	4.08	5.61	
23	7	4528	181	4.00	5.81	
24	8	4458	182	4.08	5.81	
25	9	5014	184	3.67	6.20	
26	7	5191	195	3.76	10.87	
27	12	5403	196	3.63	11.13	
28	7	5673	200	3.53	11.40	
29	8	5333	211	3.96	13.07	
30	4	5215	213	4.08	13.07	
31	9	5820	218	3.75	15.80	
32	6	5953	221	3.71	16.06	
33	5	5822	227	3.90	18.00	
34	8	6606	254	3.84	22.96	
					$166.66	$101.87
					101.87	
					$64.79	
Av.		4233	163	3.85	$1.91	

Difference in profit between best and poorest cow, $36.14.

Herd No. 2 is composed largely of grade cows, of which but six had a predominance of dairy blood. Its most striking feature is that the entire herd of 34 cows brought in a profit of only $65, or an average of $1.91 per cow, whereas had the owner disposed of the 15 cows which lost him money, he would have made over $166, and would not only have been relieved of all the labor of

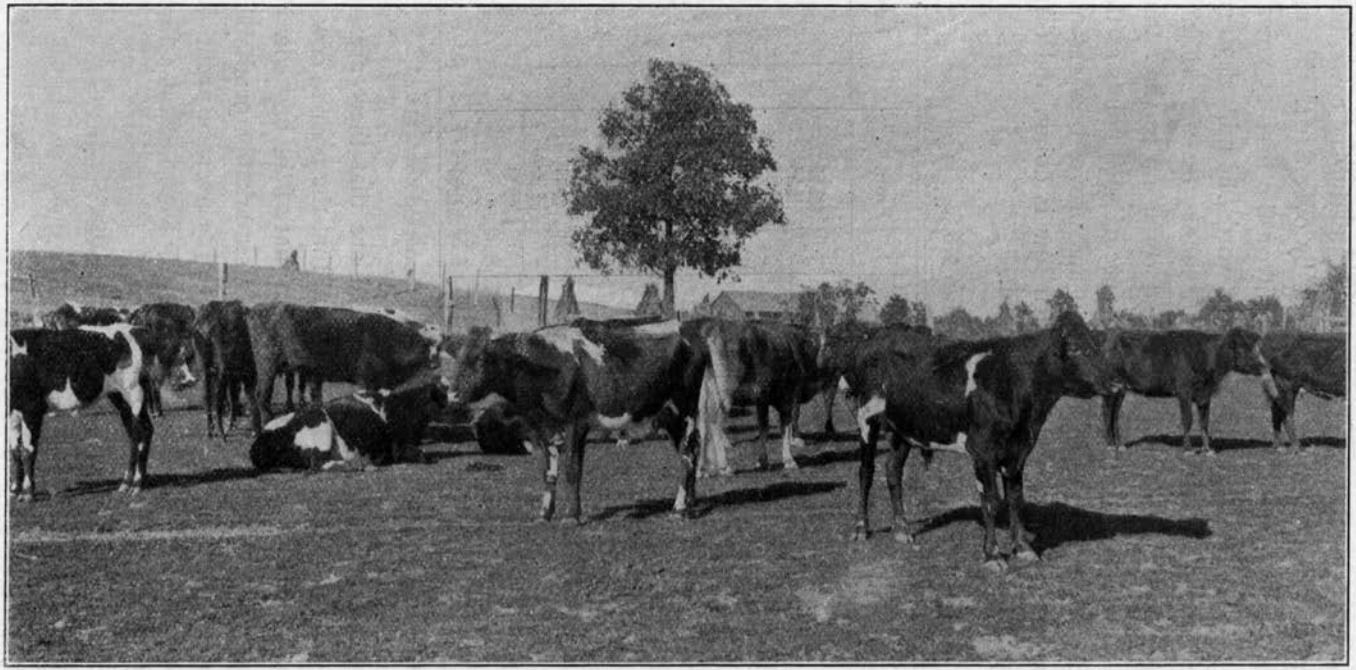
raising the feed, housing, feeding, and milking 15 cows, but would also have increased his actual profits by over $101. To meet this loss it required more than the profit of the first 15 cows on the credit side of the account. In other words, he milked 30 cows for nothing and *would have made more money had he milked but his four best cows,*—the only ones that come up to the standard a dairyman should have. The observance of such points as this rates the business ability of the dairyman and proves how essential it is that he should know just what each cow is doing, and dispose of all unprofitable members of the herd.

TABLE 4.—HERD NO. 3.

No. Cow	Age	Lb Milk	Lb. Fat	Percent Fat	Profit	Loss
1	7	6921	220	3.18	$16.65	
2	3	5380	223	4.14	15.53	
3	4	5432	223	4.10	15.53	
4	5	6652	226	3.40	18.70	
5	6	7461	227	3.04	19.15	
6	7	7272	235	3.23	19.00	
7	5	6664	237	3.55	20.90	
8	8	7027	240	3.41	21.05	
9	7	6512	263	4.04	25.16	
10	6	8087	264	3.26	26.04	
11	5	7449	278	3.73	30.15	
12	5	7051	289	4.09	32.05	
					$259.91	
Av.		6826	244	3.57	$21.66	

Difference in profit between best and poorest cow, $16.52.

The notable features of this herd are that there are no cows on the losing side of the account, and that the poorest cow made a profit of over $15, which is more than that of the best cow in many herds. While this herd contains no remarkably profitable cows, the best returning but $32, as a whole the average profit,—$21.66 per cow,—is good because no individuals were kept at a loss to reduce the profits. The total absence of unprofitable cows in the above herd speaks well for the manager's ability as a business dairyman. With more herds like this, there would be a larger number of contented dairy farmers.



HERD NO. 4.

TABLE 5.—HERD NO 4.

Cow No.	Age	Lb. Milk	Lb. Fat	Percent Fat	Profit	Loss
1		1204	49	4.07		$27.52
2		1236	50	4.05		27.20
3		2944	88	2.99		15.17
4		2597	91	3 50		15.38
5		2548	98	3.85		13.18
6		2475	99	4.00		13.18
7		2569	105	4.09		10.98
8		3164	117	3.70		8.37
9		2829	123	4.34		8.67
10		3380	149	4.41		1.58
11		4582	158	3.45	$1.41	
12		4146	174	4.20	3.41	
13		4103	177	4.31	5.41	
14		4993	191	3.82	8.40	
15		4435	200	4.51	10.21	
					$28.84	$141.23
						28.84
						$112.39
Av.		3147	124	3.94		$7.49

Difference in profit between best and poorest cow, $37.73.

This herd of 15 cows is phenomenal in the proportion of cows on the losing side of the account, and also in the excessive loss on many of them. Either one of the two poorest cows lost the owner almost as much money as was made by all the cows on the credit side of the account.

The inference might be that the cost of feed in Table 1 is too high for this herd, but the actual fact is that some of these cows were fed as much as ten pounds of grain per day, during the winter.

The most striking figure in the above table is the last one in the last column, showing a total loss of $112, which means that this man received $112 less for the products from his dairy herd than he would have received had he simply *sold the feed.* It is well, also, to note that the profit from the best cow is only $10.21, and that this best cow is indeed absolutely inferior to the poorest cow in many of the herds in the state.

This is a deplorable state of affairs,—a man trying to support a family with a herd of cows utterly unable to return a profit. The actual conditions of this man's affairs is shown by the last two

HERD NO. 5.

columns of the table, and is a forceful answer to the question, "Why test cows?" No man would conduct a losing business when fully aware of what he is doing.

Poor as this herd is, losing $112 annually, the owner, by disposing of the poorest two-thirds of his herd, without buying a single cow, might have prevented his loss of $141, and have changed himself from a cow keeper to a dairyman.

TABLE 6.—HERD NO. 5

No. Cow	Age	Lb. Milk	Lb. Fat	Percent Fat	Profit	Loss
1		5986	252	4.20	$22.66	
2		7920	254	3.21	23.84	
3		7600	260	3.42	25.75	
4		7169	293	4.08	32.20	
5		8300	295	3.55	35.00	
6		9010	322	3.58	39.87	
7		9045	333	3.68	42.07	
8		9043	337	3.72	44.27	
9		8877	344	3.87	44.27	
10		9999	348	3.48	53.53	
11		11293	376	3.33	63.99	
12		7632	403	5.28	56.69	
13		10289	422	4.10	69.70	
					$553.84	
Av.		8628	326	3.77	$42.60	

Difference in profit between best and poorest cow, $47.04

Here is a herd of high average production. Altho a grade herd, its lowest cow returned a profit of over $22, which is more than twice that of the best cow in the poorest herd, (No. 5). The difference between the individuals of the herd is large, but the star boarders were long ago eliminated, as a result of several years' work keeping individual production records of the cows and replenishing the herd by using a good pure-bred sire and raising the heifers from the best cows.

On only 96 acres of land, with practically no expense for purchased cows or feed, the owner is making with this herd a comfortable living for himself and family. He is an enthusiast instead of a plodder, reads dairy literature, turns drudgery to pleasure, and has time and money for the better things of life. He receives pay not only for his manual labor, but the neat little sum of $556 as a clear profit, to compensate for his head work.

CONCLUSIONS

The returns from cows, when expressed in dollars and cents, stand out much more vividly than they do when expressed in pounds of milk and butter fat. Therefore, if every dairyman would keep a yearly record of the amount of milk and butter fat produced by his individual cows, and from this calculate, according to Table 1, the profit or loss on the individuals, he would be astonished at the wide variation in earning capacity of the different cows in his own herd, and the results would be of untold value to him. When the herds themselves are given like consideration, a notable contrast in the variation in earning capacity of the herds is brought out.

The cows in herd No. 4 lacked $7.48 each of paying for their feed and care, while each cow in herd No. 5 made a profit of $42.77, making a difference in income of over $50 per cow between the two herds. The best cow in the good herd brought in $69.70 profit, while the poorest cow in the poor herd was kept at a loss of $27.52, making a difference in the earning power of the two cows of nearly $100 annually.

Equally surprising facts for the guidance of the dairyman would be brought out were Table 1 applied to many other dairy herds.